

Dillenia suffruticosa exhibited antioxidant and cytotoxic activity through induction of apoptosis and G2/M cell cycle arrest

ABSTRACT

Ethnopharmacological relevance: *Dillenia suffruticosa* (Family: Dilleniaceae) locally known as Simpoh air has been reported to be used traditionally to treat cancerous growth. Therefore, the present study was attempted to investigate the antioxidant and cytotoxic properties of different parts (root, flower, fruit and leaf) of *D. suffruticosa* extracts.

Methods and materials: In this study, direct solvent extraction (aqueous and methanol) from different parts of *D. suffruticosa* (root, flower, fruit and leaf) were carried out. Antioxidant activities of *D. suffruticosa* extract were determined by using DPPH, ABTS FRAP and β -carotene bleaching assays. Cytotoxicity and cell cycle arrest of the active extract were determined using MTT assay and flow cytometer, respectively. Sequential solvent extraction (hexane, DCM, EtOAc, and MeOH) were also carried out in root of *D. suffruticosa* to further evaluate the antioxidant and cytotoxic activity of the different solvent extracts.

Results: Methanol (MeOH) root extract showed the highest TPC, antioxidant and cytotoxic activities (especially towards HeLa) compared to others ($P < 0.05$). Based on the results, sequential solvent extraction (hexane, DCM, EtOAc and MeOH) was carried out in the roots of *D. suffruticosa*. MeOH extract exhibited the highest antioxidant activities among others and significantly correlated ($P < 0.05$) with TPC, suggesting the important contribution of phenolic compounds to its antioxidant activity. On the other hand, the DCM and EtOAc exhibited higher cytotoxic activity to selected cancer cells (HeLa, MCF-7, MDA-MB-231, A549 and HT29) compared to others. In short, there is no established correlation between antioxidant and cytotoxic activities of *D. suffruticosa* extracts indicating that an agent with high antioxidant activities will not necessarily possess good cytotoxic activities in return. Qualitative phytochemical screening of *D. suffruticosa* extracts suggested the presence of saponins, triterpenes, sterols, and polyphenolic compounds which are believed to contribute to the cytotoxic activities.

Conclusion: It is suggested that the cytotoxicity of the active extracts in HeLa was due to the induction of apoptosis and cell cycle arrest at G2/M.

Keyword: *Dillenia suffruticosa*; Antioxidant; Cytotoxic; Apoptosis